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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,151	08/19/2003	Xuming Guo	308-018	3612

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EXAMINER	
NAZARIO GONZALEZ, PORFIRIO	
ART UNIT	**PAPER NUMBER**
1621	

DATE MAILED: 05/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/643,151	GUO ET AL.	
	Examiner	Art Unit	
	Porfirio Nazario-Gonzalez	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *14-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of the species of group (i), methods of synthesizing an alkyl metal compound, in the reply filed on February 22, 2006 is acknowledged.

2. Claims 14-22 have been previously withdrawn from consideration as being entirely directed to non-elected species. See Office Action mailed January 30, 2006.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

5. For a rejection under 35 U.S.C. § 112, first paragraph, the following factors must be considered. *In re Wands*, 8 USPQ2d 1400, 1404 (CAFC, 1988):

1) Breath of the claims

2) Nature of the invention

3) State of the prior art

4) Level of ordinary skill in the art

5) Level of predictability in the art

6) Amount of direction and guidance provided by the inventor

7) Existence of working examples

8) Quantity of experimentation needed to make or use the invention based on the content of the disclosure.

6. The bread of the claims involves the synthesis of a transition metal alkyl or noble metal alkyl compound from an ion of said metal in an aqueous environment in which a carboxylic acid is added to the metal ion in the aqueous environment and exposing the mixture to a source of UV light. The nature of the invention is in the field of organometallic synthesis, particularly in the area of photo-alkylation reactions.

7. The state of the art shows the alkylation of heavy metals, specifically mercury, in aqueous solutions containing a carboxylic acid under UV light. See Akagi et al., Chemistry Letters, pages 1-4 (1976). Amouroux et al. (Applied Organometallic Chemistry, Vol. 14, pages 236-244 (2000)) showed the formation of organoselinide species from selenoamino acids in synthetic sea water under light conditions. The level of ordinary skill in the arts is high and limited to the alkylation of nonmetal and heavy metals in aqueous solutions under UV light.

8. The predictability or lack thereof in the art refers to the ability of one skilled in the art to extrapolate the disclosed or known results to the claimed invention. The lower the predictability, the higher the direction and guidance that must be provided by applicants. In the instant invention the predictability is very low and consequently, the need for higher levels of direction and guidance by applicant. However, the amount of direction and guidance provided by applicant is limited to the synthesis of dialkylselinide

compounds and nickel tetracarbonyl from the corresponding metal ion and a carboxylic acid in an aqueous environment under UV light. See Tables 1 and 2. No working examples are provided to show the synthesis of a transition metal alkyl or noble metal alkyl compound. Note that dimethylselinide (DMSe) is not a transition or noble metal alkyl compound but rather a dialkylchalconide (a nonmetallic compound). Paragraphs **[0079]** and **[0080]** refers to preliminary experiments with other transition and noble metals and also refer to Figures 11a-11e, however, the only transition and noble metals in the list are Ni, Co, Fe and Rh. It is also noted that both paragraph does not show the experimental data of said preliminary experiments and Figures 11a-11e are not clear as to whether the ICP-MS response is for the corresponding metal alkyl compound. Therefore, exemplification of the synthesis of DMSe, a nonmetallic compound, does not provide enablement for the synthesis of a transition metal alkyl or noble metal alkyl compounds nor it can be use to extrapolate the results to a transition metal alkyl or noble metal alkyl compound since nonmetallic compounds are chemically and electronically different from transition or noble metal compounds.

9. Therefore, the quality of experimentation required to practiced the claimed process, based on applicants' limited disclosure would be undue burden because one of ordinary skill in the art would have to perform a significant amount of experimentation to ascertain whether a transition or noble metal ion would form the corresponding the transition metal alkyl or noble metal alkyl compound when an ion of said metal in an aqueous environment is contacted with a carboxylic acid under UV light.

10. Claims 10-13 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a process of synthesizing Group 16 alkyl compounds (S, Se, Te) and Group 12 alkyl compounds (Cd, Hg), does not reasonably provide enablement for P, I, As, Bi, Cu, Au, Pt, Pd, Sb, Sn, Te, Co, Fe, Rh, Ag, Pb and Ni alkyl compounds. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

11. For a rejection under 35 U.S.C. § 112, first paragraph, the following factors must be considered. *In re Wands*, 8 USPQ2d 1400, 1404 (CAFC, 1988):

1) Breath of the claims

2) Nature of the invention

3) State of the prior art

4) Level of ordinary skill in the art

5) Level of predictability in the art

6) Amount of direction and guidance provided by the inventor

7) Existence of working examples

8) Quantity of experimentation needed to make or use the invention based on the content of the disclosure.

12. The bread of the claims involves the synthesis of a transition metal alkyl or noble metal alkyl compound from an ion of said metal in an aqueous environment in which a carboxylic acid is added to the metal ion in the aqueous environment and exposing the

mixture to a source of UV light. The nature of the invention is in the field of organometallic synthesis, particularly in the area of photo-alkylation reactions.

13. The state of the art shows the alkylation of heavy metals, specifically mercury, in aqueous solutions containing a carboxylic acid under UV light. See Akagi et al., Chemistry Letters, pages 1-4 (1976). Amouroux et al. (Applied Organometallic Chemistry, Vol. 14, pages 236-244 (2000)) showed the formation of organoselinide species from selenoamino acids in synthetic sea water under light conditions. The level of ordinary skill in the arts is high and limited to the alkylation of nonmetal and heavy metals in aqueous solutions under UV light.

14. The predictability or lack thereof in the art refers to the ability of one skilled in the art to extrapolate the disclosed or known results to the claimed invention. The lower the predictability, the higher the direction and guidance that must be provided by applicants. In the instant invention the predictability is very low and consequently, the need for higher levels of direction and guidance by applicant. However, the amount of direction and guidance provided by applicant is limited to the synthesis of dialkylselinide compounds and nickel tetracarbonyl from the corresponding metal ion and a carboxylic acid in an aqueous environment under UV light. See Tables 1 and 2. No working examples are provided to show the synthesis of P, I, As, Bi, Cu, Au, Pt, Pd, Sb, Sn, Te, Co, Fe, Rh, Ag, Pb and Ni alkyl compounds. Note that dimethylselinide (DMSe) is not a transition or noble metal alkyl compound but rather a dialkylchalconide (a nonmetallic compound). Paragraphs **[0079]** and **[0080]** refers to preliminary experiments with other transition and noble metals and also refer to Figures 11a-11e, however, the only

transition and noble metals in the list are Ni, Co, Fe and Rh. It is also noted that both paragraph does not show the experimental data of said preliminary experiments and Figures 11a-11e are not clear as to whether the ICP-MS response is for the corresponding metal alkyl compound. Therefore, exemplification of the synthesis of DMSe, a nonmetallic compound, does not provide enablement for the synthesis of a transition metal alkyl or noble metal alkyl compounds nor it can be use to extrapolate the results to a transition metal alkyl compound or noble metal alkyl compound or Group 15 alkyl compound or Group 17 alkyl compound since nonmetallic compounds are chemically and electronically different from transition or noble metal compounds, or, Group 15 or Group 17 compounds.

15. Therefore, the quality of experimentation required to practiced the claimed process, based on applicants' limited disclosure would be undue burden because one of ordinary skill in the art would have to perform a significant amount of experimentation to ascertain whether a transition or noble metal ion would form the corresponding the transition metal alkyl or noble metal alkyl compound when an ion of said metal in an aqueous environment is contacted with a carboxylic acid under UV light.

16. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

17. Claims 3, 6 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

18. Claims 3, 6 and 7 recite the limitation "an ion of Se", "an ion of Hg" and "an ion of As" respectively in line 1. There is insufficient antecedent basis for this limitation in the claim. Note that neither Se, Hg or As are a transition metal or noble metal and therefore have no antecedent basis from claim 1.

Claim Rejections - 35 USC § 102

19. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

20. Claims 10 and 11 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Akagi et al., Chemistry Letters, pages 1-4 (1976), cited by Applicants. The Akagi et al. reference discloses formation of methylmercury from mercury sulfide in an aqueous solution containing acetic acid under photo-irradiation. See entire document.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Porfirio Nazario-Gonzalez whose telephone number is 571-272-0641. The examiner can normally be reached on Mon.-Fri. (9:30 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman K. Page can be reached on 571-272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Porfirio Nazario-Gonzalez, Ph.D.
Primary Patent Examiner
Art Unit 1621

PNG
May 9, 2006